

Initial surveys to support shoreline, coastal wetland, and public access restoration at Sunset Cove Park in Queens, New York: soil sampling

November, 2013

Sunset Cove Park is an undeveloped site over nine acres in size on a Jamaica Bay inlet (near Big Egg Marsh, part of Gateway National Recreation Area). Formerly a marina and illegal dumping site, the area was seized in 2009 by New York City Department of Parks and Recreation, and is an opportunity for wetlands restoration and public access. As the site is a priority for restoration due to its large size and potential for both public access and wetlands restoration, HEP Habitat funds were used to conduct a preliminary site analysis as a first step toward future restoration. The second step of this preliminary site investigation was soil contamination sampling, completed by Langan Engineering, Environmental, Surveying, and Landscape Architecture, DPC.



Figure 1: Sunset Cove Park (outlined in yellow) in Broad Channel Queens, New York

The Harbor & Estuary Program worked with New York City Department of Parks and Recreation and the National Parks Service to determine the scope of the survey, which included property owned by both organizations. The Program worked with Jamaica Bay Ecowatchers, American Littoral Society, and Broad Channel Civic Association representatives to discuss plans, survey results, and coordinating communication about the future of the site to the Broad Channel community. As a result of this portion of the Sunset Cove project, Langan completed the following:

- Conducted soil sampling and analysis at 6, 12, and 24 inches at 18 locations. Depth was dependent on intended use (e.g. wetlands and public access/ upland restoration).
- Analyzed the soil samples for Semi-volatile and Volatile Organic Carbons (SVOCs and VOCs), polychlorinated biphenyls (PCB), Target Analyte List metal, and pesticides.
- A final technical report appended here, summarizing the results in relation to New York Codes, Rules, and Regulations 6 Part 375 Restricted Soil Cleanup Objectives for Restricted-Residential and Commercial Use).

For additional information about the project including data, contact Kate Boicourt at habitat@harborestuary.org.



Photo 1: Sunset Park facing south towards the National Park Service property on the right and the former Schmitt's Marina portion on the left. (Boicourt, 2013).



Photo 2: Jamaica Bay Ecowatchers, Broad Channel Civic Association, NYC Dept. of Parks & Recreation, and the NY-NJ Harbor & Estuary Program meet on site to discuss the future of the park (Boicourt, 2013).



Photo 3: Surveyors meet on the northeast portion of the site. Determining elevations is a first step towards habitat restoration and park development at the site (Boicourt, 2013).

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Although the information in this document has been funded wholly or in part by the United States Environmental Protection Agency under agreement CE98272003 to NEIWPC, it has not undergone the Agency's publications review process and therefore, may not necessarily reflect the views of the Agency, and no official endorsement should be inferred. The viewpoints expressed here do not necessarily represent those of the New York-New Jersey Harbor & Estuary Program, NEIWPC, or U.S. EPA, nor does mention of trade names, commercial products, or causes constitute endorsement or recommendation for use.



New York - New Jersey
Harbor & Estuary Program
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SOIL INVESTIGATION REPORT

for

SUNSET COVE PARK Broad Channel Queens, New York EPA Site No. CE97272003

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LANGAN

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1.0 INTRODUCTION

Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. (Langan) conducted a Soil Investigation (SI) for the property known as Sunset Cove Park, located in the Broad Channel neighborhood of Queens, New York ("the Site"). The objective of the investigation was to characterize soil quality to inform design options and potential costs for restoration of the site by the New York City Department of Parks and Recreation (NYCDPR) as a habitat for the local ecology and a public space for recreational usage. The investigation was completed in accordance with the Quality Assurance Project Plan (QAPP), dated September 4, 2013. The field investigation was conducted on October 9, 2013, and included collection and laboratory analysis of 33 soil samples from 18 borings. Soil sampling locations were selected by NYCDPR based on the findings of previous environmental investigations and site terrain features.

2.0 SITE BACKGROUND

2.1. Site Description and Proposed Redevelopment

The site is a 9.37-acre, undeveloped parcel located on the south side of the Broad Channel neighborhood on an inlet of Jamaica Bay. The site is bounded by West 19th Road to the north, Broad Channel American Park to the south, Jamaica Bay to the west, and private residences and Cross Bay Boulevard to the east. A Site Location Map is provided as Figure 1. The site is comprised of Tax Block 15324, Lot 1; Block 15327, Lot 10; and Block 15326, Lot 20 and also an area south of Block 15324 with no lot designation. According to New York State Department of Environmental Conservation (NYSDEC) wetlands maps, the western and central portions of the site are located within tidal wetlands. The western intertidal marsh area (i.e., low marsh area) is separated from the eastern coastal forest by a central high marsh area.

The site was acquired by NYCDPR in November 2009 after it was seized from a private party due to illegal dumping and tax evasion. NYCDPR also owns and oversees the neighboring Broad Channel American Park to the south. Prior to NYCDPR assuming ownership, the site was used as a marina and storage for boats, shipping containers, and discarded marine equipment. The site is being considered for redevelopment as a public park, which may include restoration of the wetland area. The anticipated excavation depth for development will average three feet in the low marsh area and two feet in the high marsh area. No excavation is proposed in coastal forest area.

2.2. Previous Environmental Reports

The following environmental reports have been prepared for the site and are summarized below:

1. *Limited Hazardous Materials Investigation Report, prepared by LiRo Engineers, Inc., dated May 4, 2007.*

The investigation identified the following conditions at the site:

- o The presence of 47 55-gallon drums containing oil, some of which were characterized as containing hazardous waste;
- o Several waste oil containers;
- o Three 275-gallon aboveground storage tanks (ASTs);
- o Boats, generators, motors, and marine equipment, including batteries;
- o A drainage ditch consisting mostly of construction and demolition debris and incised within fill material; and
- o Miscellaneous discarded waste and debris, including one drum containing water and debris and 51 empty drums.

The report recommended the removal of the hazardous waste, discarded debris, ASTs and abandoned equipment, and a subsurface investigation to assess soil and groundwater quality.

2. *Memorandum, prepared by Louis Berger and Associates, P.C., dated May 15, 2009*

The memorandum summarized the following site activities:

- o A site inventory was performed to quantify and characterize the abandoned marine equipment, and supervision was provided during extraction and collection of petroleum liquids from the equipment;
- o Fluids were evacuated from approximately 315 boats into vacuum trucks and transported off site. Approximately 4,800 gallons of fuel oil, motor oil, hydraulic oil, and other mechanical oils were removed;
- o Approximately 26 marine batteries were removed from the site; and
- o 123 boats were inaccessible and could not be evacuated of fluids.

The memorandum recommended that spill protection/containment be utilized during dismantling and demolition of remaining boats to prevent contamination from residual

petroleum liquids and completion of a subsurface investigation to delineate potential soil and groundwater impacts.

3. *Phase I Environmental Site Assessment (ESA), prepared by ATC Associates, Inc., dated September 15, 2009*

Several recognized environmental conditions were identified, including:

- o Solid waste (abandoned boats, construction and demolition debris, garbage, and tires) and use of the site for illegal dumping;
- o Former storage of boats, aboveground storage tank, drums, and marine batteries;
- o Imported fill of unknown quality;
- o Two off-site, open NYSDEC spill incidents (Spill Nos. 9208766 and 3102053) located upgradient and in close proximity to the site; and
- o Off-site, historical automotive repair facility with gasoline tanks located on the eastern adjoining property.

Ninety-eight drums were removed from the site during March and April 2007. The report recommended a Phase II Environmental Site Investigation to determine whether the environmental concerns impacted the suitability of the site for restoration as a park.

3.0 FIELD INVESTIGATION

The field investigation was performed on October 9, 2013 and consisted of the collection and analysis of 33 soil samples (including two field duplicates) from 18 soil borings. A field blank was also prepared and submitted for laboratory analysis. Photographs of the field investigation are included in Appendix A.

All soil borings were advanced by Eastern Environmental Services, Inc. (Eastern) of Manorville, New York using a Geoprobe® 7822 DT direct-push drill rig under the supervision of a Langan field engineer. The borings were advanced to depths ranging from 0.5 feet below ground surface (ft bgs) to 5 ft bgs. Sampling locations and depths were established in the QAPP and based on the future intended use of the site as a park. Locations and depths of selected samples were modified by NYCDPR during the investigation. Sampling depths reflected anticipated development excavation depths, which average between two and three feet in high and low marsh areas, respectively. Excavation is not planned in the coastal forest areas.

Soil borings SB-1 thru SB-5 were advanced in coastal forest areas, borings SB-7 and SB-9 through SB-11 were advanced in high marsh areas, and borings SB-6, SB-8, and SB-12 through SB-18 were advanced in low marsh areas.

Soil samples were collected into dedicated, acetate liners from each boring and classified for soil type, grain size, and texture. Each sample was evaluated for visual and olfactory evidence of environmental impacts, and screened for organic vapors with a photoionization detector (PID). A total of 31 grab soil samples were collected into dedicated, and traceable laboratory-supplied sample containers, placed in ice-chilled coolers, and shipped under proper chain-of-custody procedures to Alpha Analytical (Alpha) in Westborough, Massachusetts. Alpha is a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program certified laboratory. Two field duplicate samples were collected for quality assurance purposes. All samples were analyzed for volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), polychlorinated biphenyls (PCB), pesticides, herbicides, metals, cyanide, and hexavalent chromium in accordance with USEPA Methods 8260/5035, 8270D, 8082A, 8081B, 8151A, 3050B/7471B, 9010C/9012A, and 7196A, respectively.

Boring locations are shown on Figure 2, and soil boring logs are provided in Appendix B. Table 1 provides details regarding the soil sample depths, composition, and organic vapor concentration.

4.0 RESULTS

4.1 Subsurface Observations

Langan observed the following items during the field investigation:

- High and low marsh area - A one- to two-foot thick layer of historic fill consisting of sand comingled with fragments of brick, gravel, concrete, wood, domestic waste, and metal debris was encountered. The fill was generally underlain by an organic layer consisting of woody, decaying aquatic and coastal plants, followed by gray sand, with the exception of boring SB-17 in which historic fill was underlain by gravel.
- Coastal Forest - Soil in the coastal forest area is generally characterized by native sand and gravel. Historic fill consisting of sand comingled with gravel and fragments of brick and concrete was encountered in SB-5, which is located in the northern coastal forest area.

- No visual, olfactory or PID evidence of soil contamination was observed during the investigation. PID readings ranging from 1.2 to 3.5 parts per million (ppm) and apparent non-petroleum organic odors were observed in soil samples containing organic matter.

4.2 Analytical Results

Soil sampling results were compared to New York Codes, Rules and Regulations (NYCRR) 6 Part 375 Restricted Soil Cleanup Objectives (SCOs) for Restricted-Residential and Commercial Use. SVOCs, PCBs, and metals were detected at concentrations that exceeded the Part 375 Restricted-Residential and Commercial Use SCOs in several samples. The numerical comparisons are provided in Tables 2a and 2b, and spatially illustrated on Figure 3. In general, samples exhibiting exceedences consisted of historic fill material collected from high and low marsh areas of the site. A summary of the compounds that exceeded the standards is provided below:

4.2.1 High Marsh and Low Marsh Areas

VOCs, Pesticides and Herbicides

Concentrations of VOCs, pesticides and herbicides did not exceed 6 NYCRR Part 375 Restricted Residential Use SCOs in any samples collected from high and low marsh areas.

SVOCs

One or more of the following SVOCs exceeded 6 NYCRR Part 375 Restricted Residential and Commercial Use SCOs in six historic fill and two native soil samples:

- Benzo(a)anthracene
- Benzo(a)pyrene
- Benzo(b)fluoranthene
- Chrysene
- Dibenzo(a,h)anthracene
- Indeno(1,2,3-cd)Pyrene

The following SVOCs exceeded Part 375 Restricted Residential Use SCOs only in six historic fill and four native soil samples;

- Benzo(a)anthracene
- Benzo(b)fluoranthene
- Benzo(k)fluoranthene
- Chrysene
- Fluoranthene
- Indeno(1,2,3-cd)Pyrene
- Phenanthrene
- Pyrene

PCBs

Eight historic fill and three native soil samples contained total PCB concentrations above the 6 NYCRR Part 375 Restricted Residential and Commercial Use SCOs. One sample, SB-14-3, contained total PCBs at a concentration of 57.54 mg/kg, which exceeds the NYSDEC criterion for hazardous waste (50 mg/kg) per 6 NYCRR 371.4(e).

Metals

One or more of the following metals exceeded 6 NYCRR Part 375 Restricted Residential and Commercial Use SCOs in six historic fill and one native soil samples:

- Barium
- Cadmium
- Copper
- Mercury
- Lead

One or more of the following metals exceeded 6 NYCRR Part 375 Restricted Residential Use SCOs only in three historic fill and one native soil samples:

- Lead
- Cadmium
- Mercury

4.2.2 Costal Forest Areas

VOCs, PCBs, Pesticides, Herbicides

Concentrations of VOCs, PCBs, pesticides and herbicides did not exceed 6 NYCRR Part 375 Restricted Residential or Commercial Use SCOs in any samples collected from costal forest areas.

SVOCs

Concentrations of SVOCs did not exceed 6 NYCRR Part 375 Commercial Use SCOs in any samples collected from costal forest areas. The SVOCs benzo(b)fluoranthene and indeno(1,2,3-cd)pyrene exceeded 6 NYCRR Part 375 Restricted Residential SCOs in one soil sample, SB-4-S, which consisted of native soil.

Metals

Metals concentrations did not exceed the applicable SCOs in samples collected from coastal forest areas, with the exception of copper, which exceeded 6 NYCRR Part 375 Restricted

Residential and Commercial Use SCOs in one soil sample, SB-4-S, which consisted of native soil.

5.0 CONCLUSIONS AND RECOMMENDATIONS

The results of the soil investigation indicate that historic usage of the site has adversely impacted soil in the high and low marsh portions of the site. Soil samples collected from the coastal forest area generally did not exhibit indications of soil impacts. Based on the above findings, we conclude the following:

High and Low Marsh areas

- Historic fill containing fragments of brick, concrete, wood, domestic refuse, and metal is present at surface grade to depths of 1 to 2 ft bgs within the low and high marsh areas.
- SVOCs were detected at concentrations above 6 NYCRR Part 375 Restricted Residential and Commercial Use SCOs in multiple borings in the high and low marsh areas. The detected SVOCs are characterized as polycyclic aromatic hydrocarbons (PAH), which are typically byproducts of combustion and associated with asphalt, coal, ash, and incinerated waste. PAHs are common constituents of historic fill in New York City. However, PAH impacts to historic fill were not systematic throughout the site, and samples of native soil collected from borings SB-14 and SB-17 also contained elevated concentrations of PAHs. The elevated SVOC concentrations therefore likely reflect localized impacts from uncontrolled waste and marine equipment storage.
- Total PCBs were detected at concentrations above Part 375 Restricted Residential and Commercial Use SCOs in multiple borings. The total PCB concentration in sample SB-14-3 also exceeded the NYSDEC criterion for hazardous waste. The elevated concentrations were generally identified in historic fill, with the exception of native soil samples collected from borings SB-9, SB-14 and SB-17. PCBs were historically constituents of fluorescent light ballasts, hydraulic oil, transformer fluids, and caulking, among other components. The distribution of elevated PCB concentrations in high and low marsh areas indicates localized impacts resulting from uncontrolled waste disposal, rather than background conditions in historic fill. The vertical extent of PCB impacts was not delineated in borings SB-9, SB-14, and SB-17.
- Soil samples that contained elevated concentrations of metals included cadmium, copper, lead, and mercury, which are commonly associated with vehicle batteries, brakes, and other vehicle components. The vertical extent of metals impacts were not delineated in SB-14 and SB-16.

Coastal Forest Areas

- The coastal forest area generally does not contain historic fill, with the exception of shallow fill material observed on the northern portion of the area.
- Laboratory analytical results did not indicate VOC, PCB, pesticide, or herbicide impacts to soil.
- One sample, SB-4-S, contained two PAHs at concentrations above the 6 NYCRR Restricted Residential SCOs, and copper at a concentration above the 6 NYCRR Part 375 Restricted Residential and Commercial Use SCOs. Uncontrolled waste disposal is the likely source of these impacts.

Based on the above results, soil and fill excavated during development activities will be classified as regulated solid waste pursuant to 6 NYCRR Part 360. Based on detected PCB concentrations, soil excavated in the vicinity of boring SB-14 will also be classified as a NYSDEC hazardous waste in accordance with 6 NYCRR Part 371.4. The EPA regulates PCB-containing waste under the Toxic Substances Control Act and 40 CFR 761.3, which mandate that EPA notification is required for the disposal of solid waste containing PCBs at concentrations above 50 mg/kg. 40 CFR 761.3 also establishes cleanup levels for sites containing PCB remediation waste, based on high vs. low occupancy site usage and the presence of engineering and institutional controls (e.g., impermeable site caps and land use restrictions).

The excavated material must be managed and transported off site in accordance with applicable Federal, State, and local regulations and disposed at a facility permitted to accept contaminated soil. Additional soil sampling may be required to characterize the soil in accordance with the permit requirements of the selected disposal facility. Regulatory or disposal facility requirements may also warrant additional soil analysis for hazardous waste characteristics and additional sampling to vertically delineate the extent of SVOC and PCB impacts.

6.0 LIMITATIONS

This Soil Investigation Report was prepared expressly for the New England Interstate Water Pollution Control Commission for the Sunset Cover Park Property in Queens, New York for the objectives defined herein. Langan cannot assume responsibility for the use of this report for any property other than the specific site addressed in this report, or by any third party without specific written authorization from Langan.


The conclusions, opinions, and recommendations provided in this report are based on subsurface conditions ascertained from the analysis of a limited number of samples and from environmental reports prepared by other professionals that were provided by the client.

Recommendations provided are contingent upon one another and no recommendation should be followed independent of the others. Actual conditions encountered may differ substantially from those presented herein and should be brought to our attention whereby we may determine how such changes may affect our conclusions, opinions and recommendations.

FIGURES



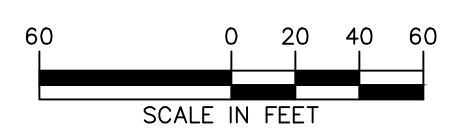
SOURCE: PORTIONS OF USGS TOPOGRAPHIC MAP, FAR ROCKAWAY QUADRANGLE, NEW YORK, 7.5 MINUTE SERIES, 2013

 21 Penn Plaza, 360 West 31st Street, 8th Floor New York, NY 10001 T: 212.479.5400 F: 212.479.5444 www.langan.com Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C. Langan Engineering and Environmental Services, Inc. Langan CT, Inc. Langan International LLC Collectively known as Langan	Project	Drawing Title	Project No.	1
	SUNSET COVE PARK	SITE LOCATION MAP	170220401	
	BROAD CHANNEL		Date	
	QUEENS	NEW YORK	11/8/2013	
			Scale	
			NTS	
			Drawn By	Checked By
			DC	SK
			Submission Date	
			11/8/2013	



- NOTES**
1. BASE MAP TAKEN FROM BING MAPS AERIAL IMAGERY SERVICES.
 2. SITE BOUNDARY SHOWN IS APPROXIMATED AND IS BASED ON THE REVISED SOIL BORING LOCATIONS MAP, PREPARED BY NYC DEPARTMENT OF PARKS & RECREATION, DATED OCTOBER 8, 2013.
 3. LOW MARSH, HIGH MARSH AND COASTAL FOREST POLYGONS ARE APPROXIMATED, AND ARE BASED ON THE REVISED SOIL BORING LOCATIONS MAP, PREPARED BY NYC DEPARTMENT OF PARKS AND RECREATION, DATED OCTOBER 8, 2013.

- LEGEND**
- SITE BOUNDARY
 - SB-1 - SOIL BORING LOCATION
 - LOW MARSH AREA
 - HIGH MARSH AREA
 - COASTAL FOREST AREA



WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

SIGNATURE _____ DATE SIGNED _____
PROFESSIONAL XXXXXXXXXX
STATE LIC. No. XXXXX

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Langan Engineering and Environmental Services, Inc.
Langan CL, Inc.
Langan International LLC
Collectively known as Langan

Project
**SOIL INVESTIGATION
REPORT**
SUNSET COVE PARK
QUEENS NEW YORK

Drawing Title
**SOIL BORING
LOCATION MAP**

Project No. 170220401	
Date 7 NOVEMBER 2013	
Scale 1" = 60'	
Drawn By SPL	Checked By DC
Submission Date 7 NOVEMBER 2013	

Drawing No.
2

Client Sample ID	SB-12-1
Lab Sample ID	L1320271-18
Sampling Date	10/9/2013
Sample Depth (ft.)	1
Polychlorinated Biphenyls (mg/kg)	
Total PCBs	2.002

Client Sample ID	SB-11-2
Lab Sample ID	L1320271-17
Sampling Date	10/9/2013
Sample Depth (ft.)	2
Metals (mg/kg)	
Barium, Total	690
Copper, Total	NE

Client Sample ID	SB-18-1
Lab Sample ID	L1320271-30
Sampling Date	10/9/2013
Sample Depth (ft.)	1
Semivolatile Organic Compounds (mg/kg)	
Benzo(a)anthracene	4.2
Benzo(a)pyrene	3.2
Benzo(b)fluoranthene	3.9
Indeno(1,2,3-cd)Pyrene	2.1 J

NOTES

- BASE MAP TAKEN FROM BING MAPS AERIAL IMAGERY SERVICES, DATED 2013.
- SITE BOUNDARY SHOWN IS APPROXIMATED AND IS BASED ON THE REVISED SOIL BORING LOCATIONS MAP, PREPARED BY NYC DEPARTMENT OF PARKS & RECREATION, DATED OCTOBER 8, 2013.
- ANALYTICAL RESULTS ARE COMPARED TO NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) PART 375 TITLE 6 OF THE OFFICIAL COMPILATION OF NEW YORK CODES, RULES AND REGULATIONS (NYCRR) PART 375 RESTRICTED USE RESTRICTED RESIDENTIAL AND RESTRICTED USE COMMERCIAL SOIL CLEANUP OBJECTIVES (SCOs).
- ONLY EXCEEDING CONCENTRATIONS ARE SHOWN.
- COMPOUNDS DETECTED AT CONCENTRATIONS EXCEEDING BOTH CRITERIA ARE SHOWN IN **BOLD**.
- NE = NO EXCEEDANCES.
- ND = NOT DETECTED.
- J = THE ANALYTE WAS POSITIVELY IDENTIFIED AND THE ASSOCIATED NUMERICAL VAULE IS THE APPROXIMATE CONCENTRATION OF THE ANALYTE IN THE SAMPLE. THIS IS AN ESTIMATED VALUE.
- P = THE RPD BETWEEN THE RESULTS FOR THE TWO COLUMNS EXCEEDS THE METHOD-SPECIFIED CRITERIA.
- I = THE LOWER VALUE FOR THE TWO COLUMNS HAS BEEN REPORTED DUE TO OBVIOUS INTERFERENCE.
- mg/kg = MILLIGRAMS PER KILOGRAM.

Client Sample ID	SB-17-1	SB-17-3
Lab Sample ID	L1320271-28	L1320271-29
Sampling Date	10/9/2013	10/9/2013
Sample Depth (ft.)	1	3
Semivolatile Organic Compounds (mg/kg)		
Benzo(a)anthracene	46	100
Benzo(a)pyrene	42	90
Benzo(b)fluoranthene	54	120
Benzo(k)fluoranthene	17	45
Chrysene	42	81
Dibenzo(a,h)anthracene	6.5	16
Fluoranthene	110	220
Indeno(1,2,3-cd)Pyrene	25	53
Phenanthrene	NE	200
Pyrene	NE	170
Polychlorinated Biphenyls (mg/kg)		
Total PCBs	NE	2.139

Client Sample ID	SB-15-1
Lab Sample ID	L1320271-24
Sampling Date	10/9/2013
Sample Depth (ft.)	1
Polychlorinated Biphenyls (mg/kg)	
Total PCBs	7.404 J

Client Sample ID	SB-13-1
Lab Sample ID	L1320271-20
Sampling Date	10/9/2013
Sample Depth (ft.)	1
Polychlorinated Biphenyls (mg/kg)	
Total PCBs	3.796
Metals (mg/kg)	
Copper, Total	500

Client Sample ID	SB-8-1
Lab Sample ID	L1320271-10
Sampling Date	10/9/2013
Sample Depth (ft.)	1
Semivolatile Organic Compounds (mg/kg)	
Benzo(a)anthracene	5.8
Benzo(a)pyrene	5.4
Benzo(b)fluoranthene	6.5
Chrysene	5.7
Indeno(1,2,3-cd)Pyrene	3.4 J
Polychlorinated Biphenyls (mg/kg)	
Total PCBs	2.35
Metals (mg/kg)	
Cadmium, Total	14
Copper, Total	710
Lead, Total	760

Client Sample ID	SB-6-1
Lab Sample ID	L1320271-06
Sampling Date	10/9/2013
Sample Depth (ft.)	1
Semivolatile Organic Compounds (mg/kg)	
Benzo(a)anthracene	16
Benzo(a)pyrene	14
Benzo(b)fluoranthene	18
Benzo(k)fluoranthene	6.3
Chrysene	15
Dibenzo(a,h)anthracene	2.2
Indeno(1,2,3-cd)Pyrene	9.6

Client Sample ID	SB-7-1
Lab Sample ID	L1320271-08
Sampling Date	10/9/2013
Sample Depth (ft.)	1
Semivolatile Organic Compounds (mg/kg)	
Benzo(a)anthracene	14
Benzo(a)pyrene	11
Benzo(b)fluoranthene	16
Benzo(k)fluoranthene	5.6
Chrysene	14
Dibenzo(a,h)anthracene	2
Indeno(1,2,3-cd)Pyrene	7.1
Polychlorinated Biphenyls (mg/kg)	
Total PCBs	1.986
Metals (mg/kg)	
Copper, Total	460

Client Sample ID	SB-14-1	SB-14-3
Lab Sample ID	L1320271-22	L1320271-23
Sampling Date	10/9/2013	10/9/2013
Sample Depth (ft.)	1	3
Semivolatile Organic Compounds (mg/kg)		
Benzo(a)anthracene	ND	67
Benzo(a)pyrene	ND	70
Benzo(b)fluoranthene	ND	32
Chrysene	ND	64
Dibenzo(a,h)anthracene	ND	9.1
Fluoranthene	ND	150
Indeno(1,2,3-cd)Pyrene	ND	34
Pyrene	ND	110
Polychlorinated Biphenyls (mg/kg)		
Total PCBs	23.49 PI	57.54 J
Metals (mg/kg)		
Barium, Total	810	NE
Cadmium, Total	27	9.9
Copper, Total	970	890
Lead, Total	3200	900
Mercury, Total	2.1	ND

Client Sample ID	SB-10-S
Lab Sample ID	L1320271-14
Sampling Date	10/9/2013
Sample Depth (ft.)	0 to 0.5
Semivolatile Organic Compounds (mg/kg)	
Benzo(a)anthracene	1.4
Benzo(a)pyrene	1.2 J
Benzo(b)fluoranthene	1.5
Indeno(1,2,3-cd)Pyrene	0.83 J

Client Sample ID	SB-4-S
Lab Sample ID	L1320271-04
Sampling Date	10/9/2013
Sample Depth (ft.)	0 to 0.5
Metals (mg/kg)	
Copper, Total	3200
Semivolatile Organic Compounds (mg/kg)	
Indeno(1,2,3-cd)Pyrene	0.63

Client Sample ID	SB-16-1
Lab Sample ID	L1320271-26
Sampling Date	10/9/2013
Sample Depth (ft.)	1
Polychlorinated Biphenyls (mg/kg)	
Total PCBs	44.29
Metals (mg/kg)	
Cadmium, Total	20
Copper, Total	1100
Lead, Total	2200
Mercury, Total	9.8

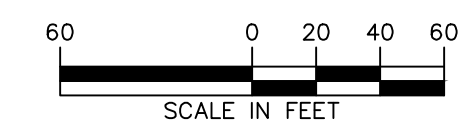
Client Sample ID	SB-9-S	SB-9-2
Lab Sample ID	L1320271-12	L1320271-13
Sampling Date	10/9/2013	10/9/2013
Sample Depth (ft.)	0 to 0.5	2
Benzo(b)fluoranthene	NE	1.2
Indeno(1,2,3-cd)Pyrene	ND	0.8 J
Polychlorinated Biphenyls (mg/kg)		
Total PCBs	1.1476	5.159
Metals (mg/kg)		
Cadmium, Total	NE	4.9

Compound	NYSDEC Part 375 Restricted Use Restricted-Residential SCO	NYSDEC Part 375 Restricted Use Commercial SCO
Semivolatile Organic Compounds (mg/kg)		
Benzo(a)anthracene	1	5.6
Benzo(a)pyrene	1	1
Benzo(b)fluoranthene	1	5.6
Benzo(k)fluoranthene	100	500
Chrysene	1	56
Dibenzo(a,h)anthracene	0.33	0.56
Fluoranthene	100	500
Indeno(1,2,3-cd)Pyrene	0.5	5.6
Phenanthrene	100	500
Pyrene	100	500
Polychlorinated Biphenyls (mg/kg)		
Total PCBs	1	1
Metals (mg/kg)		
Barium, Total	350	400
Cadmium, Total	2.5	9.3
Copper, Total	270	270
Lead, Total	400	1000
Mercury, Total	0.81	2.8



LEGEND

- SITE BOUNDARY
- SB-1 - SOIL BORING LOCATION



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 Langan Engineering and Environmental Services, Inc.
 Langan International LLC
 Collectively known as Langan

Project
SOIL INVESTIGATION REPORT
 SUNSET COVE PARK
 QUEENS NEW YORK
 Drawing Title
SOIL SAMPLE EXCEEDANCES MAP

Project No. **170220401** Drawing No.
 Date **8 NOVEMBER 2013**
 Scale **1" = 60'**
 Drawn By **SPL** Checked By **DC**
 Submission Date **8 NOVEMBER 2013**

LANGAN SUBMISSION DATE: XXXX ## ## ## PROJECT No. ## ## ## ##

TABLES

Table 1
Soil Boring and Sample Collection Summary
Sunset Cove Park
Broad Channel, Queens, New York
Langan Project No. 170220401

Location	Sample Name	Depth Interval (ft BGS)	Material Type	Organic Vapor Concentration (ppm)
Soil Samples				
SB-1	SB-1-S	0.5	Sand	0.0
SB-2	SB-2-S	0.5	Sand with Organic Material	0.0
SB-3	SB-3-S	0.5	Sand and Gravel	0.0
SB-4	SB-4-S	0.5	Sand and Gravel	0.0
SB-5	SB-5-S	0.5	Fill	0.0
SB-6	SB-6-S	0.5	Fill	0.0
	SB-6-3	3	Sand	
SB-7	SB-7-1	1	Fill	0.0
	SB-7-3	3	Sand	
SB-8	SB-8-1	1	Fill	0.0
	SB-8-3	3	Sand with Organic Material	
SB-9	SB-9-S	0.5	Fill	1.2
	SB-9-2	2	Sand with Organic Material	
SB-10	SB-10-S	0.5	Fill	0.0
	SB-10-2	2	Sand	
SB-11	SB-11-S	0.5	Fill	0.0
	SB-11-2	2	Sand	
SB-12	SB-12-1	1	Fill	0.0
	SB-12-3	3	Sand	
SB-13	SB-13-1	1	Fill	0.0
	SB-13-3	3	Sand with Organic Material	
SB-14	SB-14-1	1	Fill	0.0
	SB-14-3	3	Sand with Organic Material	
SB-15	SB-15-1	1	Fill	0.0
	SB-15-3	3	Sand with Organic Material	
SB-16	SB-16-1	1	Fill	0.0
	SB-16-3	3	Sand	
SB-17	SB-17-1	1	Fill	0.0
	SB-17-3	3	Gravel/Fill	
SB-18	SB-18-1	1	Fill	3.5
	SB-18-3	3	Sand	

Notes:

BGS = Below grade surface

ppm = Parts per million

All samples were collected on October 9, 2013, and analyzed for volatile organic compounds, semivolatile organic compounds, polychlorinated biphenyls, pesticides, and metals. Organic vapor concentrations measured with a photoionization detector.

Borings advanced in costal forest areas are shaded gray

Table 2a
Soil Sample Detections Summary
Soil Investigation
Sunset Cove Park, Broad Channel
Queens, New York
Langan Project No. 170220401

Client Sample ID	NYSDEC Part 375 Restricted Use Restricted- Residential SCO	NYSDEC Part 375 Restricted Use Commercial SCO	SB-1-S L1320271-01 10/9/2013 0 to 0.5	SB-2-S L1320271-02 10/9/2013 0 to 0.5	SB-3-S L1320271-03 10/9/2013 0 to 0.5	SB-4-S L1320271-04 10/9/2013 0 to 0.5	SB-5-S L1320271-05 10/9/2013 0 to 0.5	SB-6-1 L1320271-06 10/9/2013 1	SB-6-3 L1320271-07 10/9/2013 3	SB-7-1 L1320271-08 10/9/2013 1	SB-7-3 L1320271-09 10/9/2013 3	SB-8-1 L1320271-10 10/9/2013 1	SB-8-3 L1320271-11 10/9/2013 3
Volatile Organic Compounds (mg/kg)													
2-Butanone	100	500	0.013 U	1.2 U	0.014 U	0.71 J	0.013 U	0.011 U	0.0025 J	0.016 U	0.012 U	0.0056 J	0.012 U
4-Ethyltoluene	~	~	0.0051 U	0.47 U	0.0055 U	0.031 J	0.0052 U	0.0045 U	0.0047 U	0.0065 U	0.0047 U	0.0041 U	0.0047 U
Acetone	100	500	0.013 U	1.2 U	0.014 U	1.2 U	0.013 U	0.013 U	0.01 J	0.057 J	0.0053 J	0.043 J	0.0041 J
Carbon disulfide	~	~	0.013 U	1.2 U	0.014 U	1.2 U	0.013 U	0.0049 J	0.0057 J	0.016 U	0.0042 J	0.0026 J	0.016 U
Methylene chloride	100	500	0.013 U	0.45 J	0.014 U	0.42 J	0.013 U	0.011 U	0.012 U	0.016 U	0.012 U	0.01 U	0.012 U
Naphthalene	100	500	0.0064 U	0.59 U	0.0068 U	0.58 U	0.0066 U	0.0056 U	0.0058 U	0.0081 U	0.0058 U	0.0045 J	0.0059 U
o-Xylene	~	~	0.0026 U	0.24 U	0.0027 U	0.074 J	0.0026 U	0.0022 U	0.0023 U	0.0032 U	0.0023 U	0.002 U	0.0024 U
p/m-Xylene	~	~	0.0026 U	0.24 U	0.0027 U	0.1 J	0.0026 U	0.0022 U	0.0023 U	0.0032 U	0.0023 U	0.002 U	0.0024 U
p-Isopropyltoluene	~	~	0.0013 U	0.12 U	0.0014 U	0.12 U	0.0013 U	0.0011 U	0.0012 U	0.0016 U	0.0012 U	0.001 U	0.0012 U
Styrene	~	~	0.0026 U	0.24 U	0.0027 U	1.3 J	0.0026 U	0.0022 U	0.0023 U	0.0032 U	0.0023 U	0.002 U	0.0024 U
Tetrachloroethene	19	150	0.0013 U	0.12 U	0.0014 U	0.12 U	0.0013 U	0.0011 U	0.0012 U	0.0016 U	0.0012 U	0.00045 J	0.0012 U
Toluene	100	500	0.0019 U	0.18 U	0.002 U	1.4 J	0.002 U	0.00026 J	0.0018 U	0.0024 U	0.0018 U	0.0015 U	0.0018 U
Semivolatile Organic Compounds (mg/kg)													
2-Methylnaphthalene	~	~	0.21 U	0.65 U	0.2 U	0.85 U	0.84 U	0.9 U	0.25 U	1.2 U	0.25 U	7.9 U	0.25 U
Acenaphthene	100	500	0.14 U	0.43 U	0.13 U	0.56 U	0.56 U	1.2 J	0.17 U	2.8 J	0.16 U	1.7 J	0.16 U
Acenaphthylene	100	500	0.14 U	0.43 U	0.13 U	0.56 U	0.56 U	0.3 J	0.17 U	1.5 J	0.16 U	5.2 U	0.16 U
Acetophenone	~	~	0.18 U	0.54 U	0.17 U	0.71 U	0.7 U	0.75 U	0.21 U	0.9 U	0.2 U	6.6 U	0.21 U
Anthracene	100	500	0.11 U	0.32 U	0.1 U	0.22 J	0.15 J	8.4 J	0.12 U	7.8 J	0.12 U	2.4 J	0.12 U
Benzo(a)anthracene	1	5.6	0.11 U	0.12 J	0.1 U	0.88 J	0.43 J	16	0.12 U	14	0.12 U	5.8	0.12 U
Benzo(a)pyrene	1	1	0.14 U	0.43 U	0.13 U	0.9 J	0.4 J	14	0.17 U	11	0.16 U	5.4	0.16 U
Benzo(b)fluoranthene	1	5.6	0.11 U	0.16 J	0.1 U	1.1	0.53 J	18	0.12 U	16	0.12 U	6.5	0.12 U
Benzo(ghi)perylene	100	500	0.14 U	0.43 U	0.13 U	0.6 J	0.24 J	8.3 J	0.17 U	6 J	0.16 U	3.1 J	0.16 U
Benzo(k)fluoranthene	3.9	56	0.11 U	0.32 U	0.1 U	0.5 J	0.19 J	6.3	0.12 U	5.6	0.12 U	2.7 J	0.12 U
Biphenyl	~	~	0.4 U	1.2 U	0.38 U	1.6 U	1.6 U	1.7 U	0.48 U	0.34 J	0.47 U	15 U	0.47 U
Bis(2-Ethylhexyl)phthalate	~	~	0.18 U	0.54 U	0.17 U	1 J	0.7 U	0.75 U	0.21 U	2.8 J	0.2 U	38 J	0.089 J
Butyl benzyl phthalate	~	~	0.18 U	0.12 J	0.17 U	0.9 J	0.7 U	0.75 U	0.21 U	9.5 J	0.2 U	27 J	0.21 U
Carbazole	~	~	0.18 U	0.54 U	0.17 U	0.71 U	0.7 U	0.47 J	0.21 U	6.2 J	0.2 U	6.6 U	0.21 U
Chrysene	3.9	56	0.11 U	0.16 J	0.1 U	0.89 J	0.42 J	15	0.12 U	14	0.12 U	5.7	0.12 U
Dibenzo(a,h)anthracene	0.33	0.56	0.11 U	0.32 U	0.1 U	0.14 J	0.42 U	2.2	0.12 U	2	0.12 U	3.9 U	0.12 U
Dimethyl phthalate	~	~	0.18 U	0.54 U	0.17 U	0.84 J	0.7 U	0.75 U	0.21 U	5.3 J	0.2 U	6.6 U	0.21 U
Di-n-butylphthalate	~	~	0.18 U	0.54 U	0.17 U	0.16 J	0.7 U	0.75 U	0.21 U	0.9 U	0.2 U	6.6 U	0.21 U
Di-n-octylphthalate	~	~	0.18 U	0.54 U	0.17 U	0.71 U	0.7 U	0.75 U	0.21 U	0.9 U	0.2 U	6.6 U	0.21 U
Fluoranthene	100	500	0.11 U	0.26 J	0.1 U	1.6 J	0.83 J	0.12 U	0.12 U	32 J	0.12 U	11 J	0.12 U
Fluorene	100	500	0.18 U	0.54 U	0.17 U	0.71 U	0.7 U	2 J	0.21 U	4.3 J	0.2 U	6.6 U	0.21 U
Indeno(1,2,3-cd)Pyrene	0.5	5.6	0.14 U	0.43 U	0.13 U	0.63	0.26 J	9.6	0.17 U	7.1	0.16 U	3.4	0.16 U
Naphthalene	100	500	0.18 U	0.54 U	0.17 U	0.71 U	0.7 U	0.3 J	0.21 U	2.7 J	0.2 U	6.6 U	0.21 U
Phenanthrene	100	500	0.11 U	0.11 J	0.1 U	0.65 J	0.52 J	0.12 U	0.12 U	32 J	0.12 U	7.9 J	0.12 U
Pyrene	100	500	0.11 U	0.23 J	0.1 U	1.4 J	0.72 J	28 J	0.12 U	24 J	0.12 U	8.7 J	0.12 U
Total SCOVs	~	~	0	1.16	0	12.41	4.69	194.07	0	208.14	0	129.3	0.089

Notes and Qualifiers:

1. Grab soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 of the Official Compilation of New York Codes, Rules, and Regulations (NYCRR) Part 375 Restricted Use Residential and Restricted Use Commercial Soil Cleanup Objectives (SCO).

2. Only compounds with detections are shown in the table.

3. NYSDEC Part 375 Restricted Use Residential SCO exceedances are highlighted and bolded.

4. NYSDEC Part 375 Restricted Use Commercial SCO exceedances are underlined.

Notes and Qualifiers:

5. Method Detection Limits (MDL) above any of the three NYSDEC Part 375 SCO standards are italicized.

6. mg/kg = milligrams per kilogram

7. ~ = Criteria not available

8. J = The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.

9. U = The analyte was analyzed for, but was not detected at a level greater than or equal to the RL or the sample concentration for results impacted by blank contamination.

Table 2a
Soil Sample Detections Summary
Soil Investigation
Sunset Cove Park, Broad Channel
Queens, New York
Langan Project No. 170220401

Client Sample ID	NYSDEC Part 375 Restricted Use Restricted- Residential SCO	NYSDEC Part 375 Restricted Use Commercial SCO	SB-9-S L1320271-12 10/9/2013 0 to 0.5	SB-9-2 L1320271-13 10/9/2013 2	SB-10-S L1320271-14 10/9/2013 0 to 0.5	SB-10-2 L1320271-15 10/9/2013 2	SB-11-S L1320271-16 10/9/2013 0 to 0.5	SB-19-S (Dup of SB-11-S) L1320271-32 10/9/2013 0 to 0.5	SB-11-2 L1320271-17 10/9/2013 2	SB-12-1 L1320271-18 10/9/2013 1	SB-12-3 L1320271-19 10/9/2013 3	SB-13-1 L1320271-20 10/9/2013 1	SB-13-3 L1320271-21 10/9/2013 3
Volatile Organic Compounds (mg/kg)													
2-Butanone	100	500	0.01 U	0.017 U	0.012 U	0.011 U	0.012 U	0.01 U	0.0015 J	0.0097 U	0.71 U	0.011 U	0.011 U
4-Ethyltoluene	~	~	0.004 U	0.007 U	0.0049 U	0.0044 U	0.0047 U	0.0042 U	0.0045 U	0.0039 U	0.28 U	0.0043 U	0.0044 U
Acetone	100	500	0.01 U	0.0066 J	0.012 U	0.014 U	0.0052 J	0.01 U	0.008 J	0.0097 U	0.71 U	0.0059 J	0.018 U
Carbon disulfide	~	~	0.01 U	0.017 U	0.012 U	0.011 U	0.012 U	0.01 U	0.011 U	0.0097 U	0.71 U	0.011 U	0.011 U
Methylene chloride	100	500	0.01 U	0.017 U	0.012 U	0.011 U	0.012 U	0.01 U	0.011 U	0.0097 U	0.2 J	0.011 U	0.011 U
Naphthalene	100	500	0.005 U	0.0019 J	0.0062 U	0.0055 U	0.0059 U	0.0053 U	0.0056 U	0.0048 U	2.9 U	0.0053 U	0.0055 U
o-Xylene	~	~	0.002 U	0.0035 U	0.0025 U	0.0022 U	0.0024 U	0.0021 U	0.0022 U	0.0019 U	0.14 U	0.0021 U	0.0022 U
p/m-Xylene	~	~	0.002 U	0.0035 U	0.0025 U	0.0022 U	0.0024 U	0.0021 U	0.0022 U	0.0019 U	0.14 U	0.0021 U	0.0022 U
p-Isopropyltoluene	~	~	0.00098 J	0.0017 U	0.0012 U	0.0011 U	0.0012 U	0.001 U	0.0011 U	0.00097 U	0.071 U	0.0011 U	0.0011 U
Styrene	~	~	0.00038 J	0.0035 U	0.0025 U	0.0022 U	0.0024 U	0.0021 U	0.0022 U	0.0019 U	0.14 U	0.0021 U	0.0022 U
Tetrachloroethene	19	150	0.001 U	0.00067 J	0.00042 J	0.0011 U	0.0012 U	0.001 U	0.0011 U	0.00097 U	0.071 U	0.0011 U	0.0011 U
Toluene	100	500	0.0015 U	0.00046 J	0.0018 U	0.0016 U	0.0018 U	0.0016 U	0.0017 U	0.0014 U	0.11 U	0.0016 U	0.0017 U
Semivolatile Organic Compounds (mg/kg)													
2-Methylnaphthalene	~	~	1.3 U	1.4 U	2.7 U	0.24 U	1.3 U	0.84 U	0.24 U	0.91 U	0.24 U	0.63 U	0.24 U
Acenaphthene	100	500	0.86 U	0.28 J	1.8 U	0.16 U	0.88 U	0.56 U	0.043 J	0.61 U	0.16 U	0.42 U	0.16 U
Acenaphthylene	100	500	0.86 U	0.32 J	1.8 U	0.16 U	0.88 U	0.14 J	0.064 J	0.61 U	0.16 U	0.42 U	0.16 U
Acetophenone	~	~	1.1 U	1.2 U	2.2 U	0.2 U	1.1 U	0.7 U	0.2 U	0.32 J	0.2 U	0.53 U	0.2 U
Anthracene	100	500	0.64 U	0.55 J	0.61 J	0.12 U	0.29 J	0.42 U	0.11 J	0.15 J	0.12 U	0.14 J	0.12 U
Benzo(a)anthracene	1	5.6	0.34 J	0.97 J	1.4	0.12 U	0.68 J	0.34 J	0.24 J	0.32 J	0.058 J	0.54 J	0.12 U
Benzo(a)pyrene	1	1	0.33 J	1	1.2	0.16 U	0.6 J	0.38 J	0.23 J	0.29 J	0.16 U	0.54 J	0.16 U
Benzo(b)fluoranthene	1	5.6	0.39 J	1.2	1.5	0.12 U	0.9 J	0.53 J	0.32 J	0.38 J	0.046 J	0.79 J	0.12 U
Benzo(ghi)perylene	100	500	0.28 J	0.84 J	0.8 J	0.16 U	0.43 J	0.32 J	0.18 J	0.22 J	0.16 U	0.44 J	0.16 U
Benzo(k)fluoranthene	3.9	56	0.64 U	0.51 J	0.55 J	0.12 U	0.32 J	0.2 J	0.12 J	0.2 J	0.12 U	0.29 J	0.12 U
Biphenyl	~	~	2.4 U	2.7 U	5.1 U	0.47 U	2.5 U	1.6 U	0.45 U	1.7 U	0.46 U	1.2 U	0.45 U
Bis(2-Ethylhexyl)phthalate	~	~	0.34 J	5.6 J	2 J	0.2 U	1.1 U	1.3 J	0.2 U	0.53 J	0.2 U	4 J	0.2 U
Butyl benzyl phthalate	~	~	0.51 J	12 J	2.2 U	0.2 U	1.1 U	0.33 J	0.2 U	0.76 U	0.2 U	5.1 J	0.2 U
Carbazole	~	~	1.1 U	1.2 U	2.2 U	0.2 U	1.1 U	0.7 U	0.052 J	0.76 U	0.2 U	0.53 U	0.2 U
Chrysene	3.9	56	0.36 J	1 J	1.5 J	0.12 U	0.79 J	0.43 J	0.28 J	0.34 J	0.065 J	0.57 J	0.12 U
Dibenzo(a,h)anthracene	0.33	0.56	0.64 U	0.71 U	1.3 U	0.12 U	0.66 U	0.42 U	0.043 J	0.45 U	0.12 U	0.32 U	0.12 U
Dimethyl phthalate	~	~	1.1 U	1.2 U	2.2 U	0.2 U	1.1 U	1 U	0.2 U	14 U	0.2 U	0.53 U	0.2 U
Di-n-butylphthalate	~	~	1.1 U	0.45 J	2.2 U	0.2 U	1.1 U	0.7 U	0.2 U	0.38 J	0.36 J	0.22 J	0.2 U
Di-n-octylphthalate	~	~	1.1 U	1.2 U	2.2 U	0.2 U	1.1 U	0.7 U	0.2 U	0.76 U	0.2 U	0.45 J	0.2 U
Fluoranthene	100	500	0.66 U	1.9 U	3 U	0.12 U	1.8 U	0.66 U	0.53 J	0.68 J	0.084 J	0.97 J	0.12 U
Fluorene	100	500	1.1 U	1.2 U	2.2 U	0.2 U	1.1 U	0.7 U	0.2 U	0.76 U	0.2 U	0.53 U	0.2 U
Indeno(1,2,3-cd)Pyrene	0.5	5.6	0.86	0.8	0.83	0.16 U	0.43 J	0.31 J	0.18 J	0.2 J	0.16 U	0.38 J	0.16 U
Naphthalene	100	500	1.1 U	1.2 U	2.2 U	0.2 U	1.1 U	0.7 U	0.2 U	0.76 U	0.16 J	0.53 U	0.2 U
Phenanthrene	100	500	0.57 J	1.6 J	2.8 J	0.12 U	2 J	0.27 J	0.4 J	0.53 J	0.059 J	0.42 J	0.12 U
Pyrene	100	500	0.59 J	1.6 J	3 J	0.12 U	1.5 J	0.62 J	0.43 J	0.5 J	0.12 J	0.78 J	0.12 U
Total SCOVs	~	~	4.37	30.62	19.19	0	9.74	6.83	3.222	19.04	0.952	15.63	0

Notes and Qualifiers:

- Grab soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 of the Official Compilation of New York Codes, Rules, and Regulations (NYCRR) Part 375 Restricted Use Residential and Restricted Use Commercial Soil Cleanup Objectives (SCO).
- Only compounds with detections are shown in the table.
- NYSDEC Part 375 Restricted Use Residential SCO exceedances are highlighted and bolded.
- NYSDEC Part 375 Restricted Use Commercial SCO exceedances are underlined.

Notes and Qualifiers:

- Method Detection Limits (MDL) above any of the three NYSDEC Part 375 SCO standards are italicized.
- mg/kg = milligrams per kilogram
- ~ = Criteria not available
- ND = Not Detected
- J = The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
- U = The analyte was analyzed for, but was not detected at a level greater than or equal to the RL or the sample concentration for results impacted by blank contamination.
- P - The RPD between the results for the two columns exceeds the method-specified criteria.
- I - The lower value for the two columns has been reported due to obvious interference.

Table 2a
Soil Sample Detections Summary
Soil Investigation
Sunset Cove Park, Broad Channel
Queens, New York
Langan Project No. 170220401

Client Sample ID	NYSDEC Part 375 Restricted Use Residential SCO	NYSDEC Part 375 Restricted Use Commercial SCO	SB-14-1 L1320271-22 10/9/2013 1	SB-14-3 L1320271-23 10/9/2013 3	SB-15-1 L1320271-24 10/9/2013 1	SB-15-3 L1320271-25 10/9/2013 3	SB-16-1 L1320271-26 10/9/2013 1	SB-16-3 L1320271-27 10/9/2013 3	SB-17-1 L1320271-28 10/9/2013 1	SB-17-3 L1320271-29 10/9/2013 3	SB-18-1 L1320271-30 10/9/2013 1	SB-20-S (Dup of SB-18-1) L1320271-33 10/9/2013 0 to 0.5	SB-18-3 L1320271-31 10/9/2013 3
Volatile Organic Compounds (mg/kg)													
2-Butanone	100	500	0.02 U	0.015 U	0.055	0.012 U	0.016 U	0.014 U	0.68 U	0.016 U	0.011 U	0.01 U	0.011
4-Ethyltoluene	~	~	0.0079 U	0.0061 U	0.0041 U	0.0048 U	0.0063 U	0.0058 U	0.27 U	0.0066 U	0.0042 U	0.0041 U	0.0045 U
Acetone	100	500	0.007 J	0.0081 J	0.26 E	0.0042 J	0.016 U	0.01 J	0.68 U	0.016 U	0.0078 J	0.01 U	0.06
Carbon disulfide	~	~	0.013 J	0.015 U	0.0075 J	0.0098 J	0.016 U	0.0097 J	0.68 U	0.016 U	0.011 U	0.01 U	0.008 J
Methylene chloride	100	500	0.02 U	0.0046 J	0.01 U	0.012 U	0.016 U	0.014 U	0.2 J	0.0045 J	0.0029 J	0.01 U	0.011 U
Naphthalene	100	500	0.0099 U	0.0076 U	0.0051 U	0.006 U	0.0079 U	0.0072 U	1.9	0.023	0.0053 U	0.0051 U	0.0056 U
o-Xylene	~	~	0.004 U	0.003 U	0.002 U	0.0024 U	0.0032 U	0.0029 U	0.14 U	0.0033 U	0.0021 U	0.002 U	0.0022 U
p/m-Xylene	~	~	0.004 U	0.003 U	0.002 U	0.0024 U	0.0032 U	0.0029 U	0.14 U	0.0033 U	0.0021 U	0.002 U	0.0022 U
p-Isopropyltoluene	~	~	0.002 U	0.0058	0.001 U	0.0012 U	0.0016 U	0.0014 U	0.068 U	0.0016 U	0.0011 U	0.001 U	0.0011 U
Styrene	~	~	0.004 U	0.003 U	0.002 U	0.0024 U	0.0032 U	0.0029 U	0.14 U	0.0033 U	0.0021 U	0.002 U	0.0022 U
Tetrachloroethene	19	150	0.002 U	0.0015 U	0.0014	0.0012 U	0.0011 J	0.0014 U	0.068 U	0.0016 U	0.0011 U	0.001 U	0.0011 U
Toluene	100	500	0.003 U	0.0023 U	0.0015 U	0.0018 U	0.0024 U	0.0022 U	0.1 U	0.0025 U	0.0016 U	0.0015 U	0.0017 U
Semivolatile Organic Compounds (mg/kg)													
2-Methylnaphthalene	~	~	4.4 U	10 U	0.91 U	0.25 U	4.4 U	0.3 U	1.3 J	6.6	4.9 U	1.1 U	0.24 U
Acenaphthene	100	500	2.9 U	5.9 J	0.61 U	0.16 U	2.9 U	0.2 U	5.7	18	3.2 U	0.74 U	0.16 U
Acenaphthylene	100	500	2.9 U	9	0.61 U	0.16 U	2.9 U	0.2 U	3	5.9	3.2 U	0.2 J	0.16 U
Acetophenone	~	~	3.7 U	8.7 U	0.76 U	0.2 U	3.6 U	0.25 U	2.1 U	2.1 U	4.1 U	0.93 U	0.2 U
Anthracene	100	500	2.2 U	23	0.16 J	0.12 U	2.2 U	0.15 U	21	56	1.3 J	0.24 J	0.072 J
Benzo(a)anthracene	1	5.6	2.2 U	67	0.64	0.12 U	2.2 U	0.15 U	46	100	4.2	0.74	0.16
Benzo(a)pyrene	1	1	2.9 U	54	0.61	0.16 U	2.9 U	0.2 U	42	90	3.2	0.71 J	0.12 J
Benzo(b)fluoranthene	1	5.6	2.2 U	70	0.83	0.12 U	2.2 U	0.15 U	54	120	3.9	0.91	0.16
Benzo(ghi)perylene	100	500	0.76 J	30	0.43 J	0.16 U	2.9 U	0.2 U	23	44	2 J	0.44 J	0.07 J
Benzo(k)fluoranthene	3.9	56	2.2 U	32	0.23 J	0.12 U	2.2 U	0.15 U	17	45	1.6 J	0.35 J	0.068 J
Biphenyl	~	~	8.4 U	20 U	1.7 U	0.47 U	8.3 U	0.56 U	4.7 U	2.7 J	9.3 U	2.1 U	0.46 U
Bis(2-Ethylhexyl)phthalate	~	~	66	240	1.5	0.1 J	53	0.25 U	2.1 U	2.1 U	4.1 U	0.62 J	0.2 U
Butyl benzyl phthalate	~	~	37	88	3.7	0.081 J	27	0.25 U	2.1 U	2.1 U	4.1 U	0.93 U	0.2 U
Carbazole	~	~	3.7 U	10	0.76 U	0.2 U	3.6 U	0.25 U	6.4	14	4.1 U	0.93 U	0.2 U
Chrysene	3.9	56	2.2 U	64	0.76	0.12 U	2.2 U	0.15 U	42	81	3.7	0.76	0.16
Dibenzo(a,h)anthracene	0.33	0.56	2.2 U	9.1	0.46 U	0.12 U	2.2 U	0.15 U	6.5	16	2.4 U	0.56 U	0.12 U
Dimethyl phthalate	~	~	3.7 U	8.7 U	0.76 U	0.2 U	3.6 U	0.25 U	2.1 U	2.1 U	4.1 U	0.93 U	0.2 U
Di-n-butylphthalate	~	~	27	3.6 J	0.76 U	0.2 U	3.6 U	0.25 U	2.1 U	2.1 U	4.1 U	0.93 U	0.2 U
Di-n-octylphthalate	~	~	4.3	8.7 U	0.76 U	0.2 U	20	0.25 U	2.1 U	2.1 U	4.1 U	0.93 U	0.2 U
Fluoranthene	100	500	2.2 U	150	1.3	0.12 U	2.2 U	0.15 U	110	220	8.6	1.5	0.37
Fluorene	100	500	3.7 U	7.7 J	0.76 U	0.2 U	3.6 U	0.25 U	7.8	27	4.1 U	0.93 U	0.2 U
Indeno(1,2,3-cd)Pyrene	0.5	5.6	2.9 U	34	0.45 J	0.16 U	2.9 U	0.2 U	25	53	2.1 J	0.48 J	0.078 J
Naphthalene	100	500	3.7 U	8.7 U	0.76 U	0.2 U	3.6 U	0.25 U	2.4	9.2	4.1 U	0.93 U	0.2 U
Phenanthrene	100	500	2.2 U	100	0.48	0.12 U	2.2 U	0.15 U	73	200	6	0.86	0.24
Pyrene	100	500	2.2 U	110	1.1	0.12 U	2.2 U	0.15 U	83	170	6.8	1.2	0.27
Total SCOVs	~	~	135.06	1107.3	12.19	0.181	100	0	569.1	1278.4	43.4	9.01	1.768

Notes and Qualifiers:

- Grab soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 of the Official Compilation of New York Codes, Rules, and Regulations (NYCRR) Part 375 Restricted Use Residential and Restricted Use Commercial Soil Cleanup Objectives (SCO).
- Only compounds with detections are shown in the table.
- NYSDEC Part 375 Restricted Use Residential SCO exceedances are highlighted and bolded.
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Notes and Qualifiers:

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- mg/kg = milligrams per kilogram
- ~ = Criteria not available
- ND = Not Detected
- J = The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
- U = The analyte was analyzed for, but was not detected at a level greater than or equal to the RL or the sample concentration for results impacted by blank contamination.
- P - The RPD between the results for the two columns exceeds the method-specified criteria.
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**Table 2b
Soil Sample Detections Summary
Soil Investigation
Sunset Cove Park, Broad Channel
Queens, New York
Langan Project No. 170220401**

Client Sample ID	NYSDEC Part 375 Restricted Use Residential SCO	NYSDEC Part 375 Restricted Use Commercial SCO	SB-1-S L1320271-01 10/9/2013 0 to 0.5	SB-2-S L1320271-02 10/9/2013 0 to 0.5	SB-3-S L1320271-03 10/9/2013 0 to 0.5	SB-4-S L1320271-04 10/9/2013 0 to 0.5	SB-5-S L1320271-05 10/9/2013 0 to 0.5	SB-6-1 L1320271-06 10/9/2013 1	SB-6-3 L1320271-07 10/9/2013 3	SB-7-1 L1320271-08 10/9/2013 1	SB-7-3 L1320271-09 10/9/2013 3	SB-8-1 L1320271-10 10/9/2013 1	SB-8-3 L1320271-11 10/9/2013 3
Polychlorinated Biphenyls (mg/kg)													
Aroclor 1248	~	~	0.0345 U	0.0534 U	0.0319 U	0.0341 U	0.0343 U	0.423	0.0399 U	0.913	0.0399 U	0.368 U	0.0401 U
Aroclor 1254	~	~	0.0345 U	0.0534 U	0.0319 U	0.304	0.0881	0.308	0.0399 U	0.835	0.0399 U	2.35	0.0401 U
Aroclor 1260	~	~	0.0345 U	0.0534 U	0.0319 U	0.112	0.0343 U	0.102	0.0399 U	0.238	0.0399 U	0.368 U	0.0401 U
Aroclor 1268	~	~	0.0345 U	0.0534 U	0.0319 U	0.0341 U	0.0343 U	0.0363 U	0.0399 U	0.086 U	0.0399 U	0.368 U	0.0401 U
Total PCBs	1	1	ND	ND	ND	0.416	0.0881	0.833	ND	1.986	ND	2.35	ND
Pesticides (mg/kg)													
Endrin	11	89	0.000698 U	0.00108 U	0.000666 U	0.154	0.149	0.168	0.000791 U	0.000873 U	0.000816 U	0.12	0.00081 U
Endrin ketone	~	~	0.00168 U	0.0026 U	0.0016 U	0.0167 U	0.0168 U	0.0175 U	0.0019 U	0.0021 U	0.00196 U	0.0172 U	0.00194 U
Dibenzofuran	59	350	0.18 U	0.54 U	0.17 U	0.71 U	0.7 U	0.8	0.21 U	3	0.2 U	6.6 U	0.21 U
Dieldrin	0.2	1.4	0.00105 U	0.00162 U	0.000998 U	0.0104 U	0.024	0.0261	0.00118 U	0.00131 U	0.00122 U	0.0108 U	0.00121 U
4,4'-DDE	8.9	62	0.000558 J	0.0186	0.000599 J	0.0167 U	0.0168 U	0.0175 U	0.00406	0.0021 U	0.00196 U	0.0172 U	0.00194 U
4,4'-DDD	13	92	0.00168 U	0.0128	0.0016 U	0.0167 U	0.0168 U	0.0175 U	0.0121	0.0158	0.00196 U	0.0172 U	0.00194 U
4,4'-DDT	7.9	47	0.00182 J	0.0206	0.003 U	0.203	0.2	0.218	0.00356 U	0.0512 PI	0.00367 U	0.242	0.00364 U
cis-Chlordane	4.2	24	0.00209 U	0.00325 U	0.002 U	0.0209 U	0.0211 U	0.0218 U	0.00237 U	0.00262 U	0.00245 U	0.011 J	0.00243 U
trans-Chlordane	~	~	0.00209 U	0.00325 U	0.002 U	0.0209 U	0.0211 U	0.0218 U	0.00237 U	0.00262 U	0.00245 U	0.0215 U	0.00243 U
Chlordane	~	~	0.0136 U	0.0211 U	0.013 U	0.136 U	0.137 U	0.142 U	0.0154 U	0.017 U	0.0159 U	0.14 U	0.0158 U
Herbicides (mg/kg)													
Herbicides	~	~	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals (mg/kg)													
Arsenic, Total	16	16	0.4 J	1.5	0.56	3.8	4.6	3.6	2.3	5.2	0.32 J	12	1.5
Barium, Total	400	400	4.3	5.8	3.7	62	47	100	12	81	7.3	270	18
Beryllium, Total	72	590	0.21 U	0.07 J	0.2 U	0.14 J	0.18 J	0.47	0.05 J	0.16 J	0.24 U	0.16 J	0.24 U
Cadmium, Total	4.3	9.3	0.08 J	0.13 J	0.03 J	2.5	0.68	1	0.34 J	1.3	0.1 J	14	0.27 J
Chromium, Trivalent	180	1500	2.2	8.4	2.1	11	12	17	6.6	22	1.7	61	3.9
Chromium, Hexavalent	110	400	0.86 U	1.3 U	0.81 U	0.86 U	0.51 J	0.54 J	1 U	1.1 U	0.99 U	0.91 U	1 U
Copper, Total	270	270	3.5	15	2.9	3200	89	82	24	460	21	710	9.9
Lead, Total	400	1000	8.3	98	27	270	110	150	60	390	7	760	23
Manganese, Total	2000	10000	13	28	8.1	140	170	210	32	93	8.1	330	21
Mercury, Total	0.81	2.8	0.08 U	0.12 U	0.07 U	0.18	0.41	0.09 U	0.1 U	0.28	0.09 U	0.69	0.1 U
Nickel, Total	310	310	1.1	4.6	0.84 J	21	11	18	6	28	1.4	250	3.5
Selenium, Total	180	1500	0.83 U	0.21 J	0.78 U	0.21 J	0.34 J	0.44 J	0.46 J	1 U	0.96 U	0.36 J	0.95 U
Silver, Total	180	1500	0.42 U	0.65 U	0.39 U	0.49	0.18 J	0.11 J	0.18 J	0.18 J	0.48 U	0.69	0.48 U
Zinc, Total	10000	10000	12	89	5.5	6000	100	410	33	690	51	5400	97
General Chemistry													
Solids, Total (%)	~	~	92.8	60.1	98.9	92.8	92.8	88.6	79.3	73.7	80.8	87.5	78.6
Cyanide, Total	27	27	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes and Qualifiers:

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Soil Investigation
Sunset Cove Park, Broad Channel
Queens, New York
Langan Project No. 170220401

Client Sample ID	NYSDEC Part 375 Restricted Use Residential SCO	NYSDEC Part 375 Restricted Use Commercial SCO	SB-9-S L1320271-12 10/9/2013 0 to 0.5	SB-9-2 L1320271-13 10/9/2013 2	SB-10-S L1320271-14 10/9/2013 0 to 0.5	SB-10-2 L1320271-15 10/9/2013 2	SB-11-S L1320271-16 10/9/2013 0 to 0.5	SB-19-S (Dup of SB-11-S) L1320271-32 10/9/2013 0 to 0.5	SB-11-2 L1320271-17 10/9/2013 2	SB-12-1 L1320271-18 10/9/2013 1	SB-12-3 L1320271-19 10/9/2013 3	SB-13-1 L1320271-20 10/9/2013 1	SB-13-3 L1320271-21 10/9/2013 3
Polychlorinated Biphenyls (mg/kg)													
Aroclor 1248	~	~	0.552	2.95	0.0448 U	0.0396 U	0.0359 U	0.0343 U	0.0382 U	0.376 U	0.0394 U	2.71	0.0381 U
Aroclor 1254	~	~	0.255	1.66	0.0288 J	0.0396 U	0.0212 J	0.118	0.0382 U	1.5	0.108	0.66	0.0381 U
Aroclor 1260	~	~	0.245	0.549	0.0149 J	0.0396 U	0.0181 J	0.124	0.647	0.502	0.478	0.426	0.0381 U
Aroclor 1268	~	~	0.0956	0.375 U	0.0448 U	0.0396 U	0.0359 U	0.0343 U	0.0382 U	0.376 U	0.0394 U	0.352 U	0.0381 U
Total PCBs	1	1	1.1476	5.159	0.0437 J	ND	0.0393 J	0.242	0.647	2.002	0.586	3.796	ND
Pesticides (mg/kg)													
Endrin	11	89	0.13	0.143	0.175	0.000825 U	0.153	0.00345 U	0.0154 U	0.159	0.00103 PI	0.12	0.000767 U
Endrin ketone	~	~	0.017 U	0.0181 U	0.0218 U	0.00198 U	0.00913 J	0.00828 U	0.0369 U	0.0178 U	0.00187 U	0.0173 U	0.00184 U
Dibenzofuran	59	350	1.1 U	1.2 U	2.2 U	0.2 U	1.1 U	0.7 U	0.2 U	0.76 U	0.2 U	0.53 U	0.2 U
Dieldrin	0.2	1.4	0.0106 U	0.0168 PI	0.0136 U	0.00124 U	0.0108 U	0.00518 U	0.023 U	0.0111 U	0.00176 U	0.0382	0.00115 U
4,4'-DDE	8.9	62	0.0373 P	0.0181 U	0.0218 U	0.00198 U	0.0172 U	0.00828 U	0.117	0.0178 U	0.00187 U	0.0173 U	0.00184 U
4,4'-DDD	13	92	0.017 U	0.0181 U	0.0218 U	0.00198 U	0.0128 J	0.0101	0.0369 U	0.0195 P	0.00215	0.0267	0.00184 U
4,4'-DDT	7.9	47	0.197	0.2 PI	0.231	0.00371 U	0.194	0.0158 PI	0.257	0.246	0.00213 J	0.245 P	0.00345 U
cis-Chlordane	4.2	24	0.0212 U	0.0227 U	0.0272 U	0.00248 U	0.0216 U	0.0104 U	0.164 PI	0.0222 U	0.0104	0.0216 U	0.0023 U
trans-Chlordane	~	~	0.0212 U	0.0227 U	0.0272 U	0.00248 U	0.0216 U	0.0104 U	0.171 PI	0.0222 U	0.00893 PI	0.0216 U	0.0023 U
Chlordane	~	~	0.138 U	0.147 U	0.177 U	0.0161 U	0.14 U	0.0673 U	0.851 PI	0.144 U	0.122 P	0.14 U	0.015 U
Herbicides (mg/kg)													
Herbicides	~	~	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals (mg/kg)													
Arsenic, Total	16	16	4.4	5.6	3.5	0.52	2.2	2.6	3.5	6.2	1.2	6.1	0.82
Barium, Total	400	400	120	270	44	4	19	21	690	40	6.8	170	4.7
Beryllium, Total	72	590	0.26	0.1 J	0.51	0.24 U	0.11 J	0.12 J	0.07 J	0.16 J	0.24 U	0.21	0.24 U
Cadmium, Total	4.3	9.3	1	4.9	1.2	0.04 J	0.24 J	0.62	0.77	0.76	0.12 J	3.3	0.04 J
Chromium, Trivalent	180	1500	19	24	50	2.3	6.4	9.3	13	15	2.6	27	2
Chromium, Hexavalent	110	400	0.86 U	0.44 J	0.51 J	0.25 J	0.91 U	0.85 U	0.97 U	0.93 U	0.99 U	0.87 U	0.96 U
Copper, Total	270	270	50	140	32	2.7	26	560	63	250	14	500	0.51
Lead, Total	400	1000	260	390	63	38	72	86	190	79	6.1	370	1 J
Manganese, Total	2000	10000	260	140	720	8	85	120	64	250	18	270	16
Mercury, Total	0.81	2.8	0.1	0.22	0.08 J	0.09 U	0.07	0.11	0.08 U	0.13	0.09 U	0.53	0.09 U
Nickel, Total	310	310	23	62	65	0.79 J	5.7	11	7.9	10	1.4	37	1.1 J
Selenium, Total	180	1500	0.34 J	0.4 J	1 U	0.95 U	0.89 U	0.8 U	0.32 J	0.17 J	0.95 U	0.29 J	0.95 U
Silver, Total	180	1500	0.42 U	2	0.15 J	0.47 U	0.44 U	0.4 U	0.11 J	0.45 U	0.48 U	0.35 J	0.47 U
Zinc, Total	10000	10000	200	1400	75	8.7	42	170	370	120	39	720	4.6
General Chemistry													
Solids, Total (%)	~	~	93.3	84.5	72.2	79.9	87.9	94.4	82.5	85.9	81	91.7	83.6
Cyanide, Total	27	27	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes and Qualifiers:

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Queens, New York
Langan Project No. 170220401

Client Sample ID	NYSDEC Part 375 Restricted Use Residential SCO	NYSDEC Part 375 Restricted Use Commercial SCO	SB-14-1 L1320271-22 10/9/2013 1	SB-14-3 L1320271-23 10/9/2013 3	SB-15-1 L1320271-24 10/9/2013 1	SB-15-3 L1320271-25 10/9/2013 3	SB-16-1 L1320271-26 10/9/2013 1	SB-16-3 L1320271-27 10/9/2013 3	SB-17-1 L1320271-28 10/9/2013 1	SB-17-3 L1320271-29 10/9/2013 3	SB-18-1 L1320271-30 10/9/2013 1	SB-20-S (Dup of SB-18-1) L1320271-33 10/9/2013 0 to 0.5	SB-18-3 L1320271-31 10/9/2013 3
Polychlorinated Biphenyls (mg/kg)													
Aroclor 1248	~	~	11.2	29.2	5.26	0.0402 U	7.05 U	0.0196 J	0.0414 U	0.9	0.0823 U	0.0366 U	0.0387 U
Aroclor 1254	~	~	10.6	24.2	1.71	0.0402 U	35.5 U	0.011 J	0.0414 U	0.951	0.0823 U	0.192	0.0387 U
Aroclor 1260	~	~	1.69 PI	4.14 J	0.434 J	0.0402 U	8.79	0.049 U	0.0634	0.288	0.0823 U	0.0913	0.0387 U
Aroclor 1268	~	~	1.44 U	4.18 U	0.74 U	0.0402 U	7.05 U	0.049 U	0.0414 U	0.0823 U	0.0823 U	0.0366 U	0.0387 U
Total PCBs	1	1	23.49 PI	57.54 J	7.404 J	ND	44.29	0.0306 J	0.0634	2.139	ND	0.2833	ND
Pesticides (mg/kg)													
Endrin	11	89	0.00726 U	0.00866 U	0.00377 U	0.000831 U	0.00724 U	0.00096 U	0.0168 U	0.0041 U	0.0164 U	0.000724 U	0.000792 U
Endrin ketone	~	~	0.0174 U	0.0208 U	0.00906 U	0.00199 U	0.0174 U	0.0023 U	0.0404 U	0.00984 U	0.0395 U	0.00174 U	0.0019 U
Dibenzofuran	59	350	3.7 U	5.3 J	0.76 U	0.2 U	3.6 U	0.25 U	3.2	13	4.1 U	0.93 U	0.2 U
Dieldrin	0.2	1.4	0.0109 U	0.013 U	0.107	0.00125 U	0.0108 U	0.00144 U	0.0252 U	0.00615 U	0.0247 U	0.00109 U	0.00119 U
4,4'-DDE	8.9	62	0.0174 U	0.0208 U	0.00906 U	0.00199 U	0.0174 U	0.0023 U	0.0404 U	0.00984 U	0.0395 U	0.00174 U	0.0019 U
4,4'-DDD	13	92	0.0174 U	0.0208 U	0.00906 U	0.00199 U	0.0174 U	0.0023 U	0.0404 U	0.00984 U	0.0395 U	0.00174 U	0.0103
4,4'-DDT	7.9	47	0.0327 U	0.039 U	0.017 U	0.00374 U	0.0326 U	0.00432 U	0.0757 U	0.0184 U	0.074 U	0.00326 U	0.00356 U
cis-Chlordane	4.2	24	0.0218 U	0.026 U	0.0404 PI	0.00249 U	0.0217 U	0.00288 U	0.342	0.0828	0.0494 U	0.00217 U	0.00237 U
trans-Chlordane	~	~	0.0218 U	0.026 U	0.0113 U	0.00249 U	0.0217 U	0.00288 U	0.227 PI	0.074	0.0494 U	0.00217 U	0.00237 U
Chlordane	~	~	0.142 U	0.169 U	0.0736 U	0.0162 U	0.141 U	0.0187 U	1.08 PI	0.583	0.321 U	0.0141 U	0.0154 U
Herbicides (mg/kg)													
Herbicides	~	~	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals (mg/kg)													
Arsenic, Total	16	16	16	14	15	2.9	11	0.52 J	12	5.9	4.2	2	1.2
Barium, Total	400	400	810	260	140	29	240	2.9	150	120	54	25	11
Beryllium, Total	72	590	0.31 J	0.08 J	0.26	0.24 U	0.11 J	0.28 U	0.43	0.28	0.19 J	0.09 J	0.24 U
Cadmium, Total	4.3	9.3	27	9.9	3.7	0.1 J	20	0.14 J	1.1	0.98	0.33 J	0.21 J	0.06 J
Chromium, Trivalent	180	1500	130	55	52	2.2	77	2.7	22	17	8.6	5.9	2.5
Chromium, Hexavalent	110	400	0.89 U	1 U	0.92 U	1 U	0.88 U	1.2 U	1 U	1 U	1 U	0.9 U	0.97 U
Copper, Total	270	270	970	890	210	2.2	1100	12	71	56	59	55	16
Lead, Total	400	1000	3200	900	360	2.4	2200	14	160	130	110	46	30
Manganese, Total	2000	10000	550	200	260	12	300	16	270	230	150	81	11
Mercury, Total	0.81	2.8	2.1	0.08 U	0.29	0.1 U	9.8	0.1 U	0.46	0.23	0.08 J	0.15	0.09
Nickel, Total	310	310	310	160	37	2.8	250	18	15	12	8.7	5.2	1.3
Selenium, Total	180	1500	4.4 U	0.54 J	0.36 J	0.96 U	0.64 J	1.1 U	0.33 J	1 U	0.96 U	0.86 U	0.96 U
Silver, Total	180	1500	1.1 J	0.48 J	0.18 J	0.48 U	1.3	0.56 U	0.1 J	0.12 J	0.48 U	0.43 U	0.48 U
Zinc, Total	10000	10000	5400	5900	1900	14	5900	440	250	240	110	46	23
General Chemistry													
Solids, Total (%)	~	~	89.9	76.5	86.8	78.9	90.7	66.8	78	77.5	79.8	88.4	82.2
Cyanide, Total	27	27	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes and Qualifiers:

- Grab soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Title 6 of the Official Compilation of New York Codes, Rules, and Regulations (NYCRR) Part 375 Restricted Use Residential and Restricted Use Commercial Soil Cleanup Objectives (SCO).
- Only compounds with detections are shown in the table.
- NYSDEC Part 375 Restricted Use Residential SCO exceedances are highlighted and bolded.
- NYSDEC Part 375 Restricted Use Commercial SCO exceedances are underlined.

Notes and Qualifiers:

- Method Detection Limits (MDL) above any of the three NYSDEC Part 375 SCO standards are italicized.
- mg/kg = milligrams per kilogram
- ~ = Criteria not available
- ND = Not Detected
- J = The analyte was positively identified and the associated numerical value is the approximate concentration of the analyte in the sample.
- U = The analyte was analyzed for, but was not detected at a level greater than or equal to the RL or the sample concentration for results impacted by blank contamination.
- P - The RPD between the results for the two columns exceeds the method-specified criteria.
- I - The lower value for the two columns has been reported due to obvious interference.

APPENDICES

APPENDIX A – PHOTOGRAPHIC LOG



Photo 1 - Sampling using Geoprobe drill rig. View is towards the northwest.



Photo 2 - Sampling using Geoprobe drill rig. View is towards the north.



Photo 3 - Typical constituents of historic fill at the site.



Photo 4 - Typical constituents of native soil at the site.



Photo 5 - View of adjoining Broad Channel and Jamaica Bay towards the west.